HISTORIC TREND AND FORECAST OF MOTOR VEHICLE TRAVEL IN THE PROVINCE OF ONTARIO

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by

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1. INTRODUCTION

In the everyday work of highway planning, predictions of growth in population, motor-vehicle registration and vehicle-miles of travel are of crucial importance. As Ontario's economic activities continue to enlarge, more highway traffic is generated and the demand for highway service is intensified. Therefore it is urgent to establish estimates on anticipated highway traffic before designing improvements which must necessarily be capable of sustaining the required level of transportation for the next 20 years - the time period generally accepted by the Department of Highways Ontario as an optimum planning period.

In 1955, the Statistics and Economics Section of the Planning and Design Branch, Department of Highways Ontario, prepared a report entitled "Prediction of Traffic in Ontario". This study was revised and issued in 1957 as "Future Passenger Car and Commercial Vehicle Travel in the Province of Ontario".

The present study is the third in a series of periodical surveys of the traffic growth in the Province, and it cancels and supersedes all previous motor-vehicle travel forecasts which have been prepared by the Department of Highways Ontario.

In this study, methods which depart from those used in the 1957 travel forecast report are described in the sections concerning individual components used to develop motor vehicle travel. The assumptions and limitations are indicated where necessary.

To date the actual motor-vehicle statistics for 1960 have not been published, therefore the base year for the forecasts made in this study is 1959.

According to general practice, motor vehicles are classified only as passenger cars, buses, and trucks. Consequently, in this report, motor vehicle statistics exclude motorcycle totals. Passenger cars include dual-purpose vehicles (station wagons and jeeps), and commercial vehicles consist of trucks and buses.

Estimates of highway travel are based upon a study of three chief factors - population, motor vehicle registration, and miles of travel per vehicle or gasoline consumption per vehicle. Small boosts in each factor yield large increments in total traffic.

The revised motor vehicle travel prediction in this report is based on the assumption of a continuance of present economic levels. Should considerable changes occur in the economy of Ontario, they could have a noticeable influence on the accuracy of present predictions.

A few comprehensive surveys regarding motor-vehicle travel are known to have been conducted elsewhere in Canada. United States reports of this nature were studied and the percentage relations between vehicle types in motor-vehicle registration, gasoline consumption and vehicle-miles of travel have been investigated and compared with Ontario estimates. These comparisons are not only interesting but serve as an instructive example, because in the United States very extensive research is being done in the highway field.

In restudying and revising the trend of future motor-vehicle travel for this report, maximum use has been made of all the latest available data.

It should be noted that: "...there are several instances where the observed differences in trend between the projection and the realization are so pronounced as to throw great suspicion on the forecasted values. In short-range forecasting such an indication for even a single year is sufficient to discredit the forecast, but in long-range prognostication such

divergences usually become serious only if they continue for three years or more".*

2. SUMMARY OF FINAL RESULTS

These are the forecasts for 1979:

Population - 9,630,000, a gain of 62 percent or a rate of increase of 1.62 times over 5,952,000 people in 1959.

Vehicles - 4,015,000 motor vehicles (passenger cars and commercial vehicles), a growth of 105 percent or a rate of increase of 2.04 times over the 1,963,000 registered in 1959.

Ownership - 2.4 people per motor vehicle in 1979 as compared to 3.0 people per motor vehicle in 1959. This may be expressed as

41.7 motor vehicles per 100 persons, a rise of 26 percent or a rate of increase of 1.26 times over the 33.0 motor vehicles per 100 people in 1959.

Taxable gasoline consumption - 2,428,000,000 imperial gallons of gasoline, an advancement of 108.70 percent or a rate of increase of 2.09 times over the 1,163,392,000 imperial gallons of gasoline consumed in 1959.

Vehicle travel - 10,263 vehicle-miles annually by the average motor vehicle, a 9 percent gain or a rate of increase of 1.09 over the 9,421 vehicle-miles, the 1959 average.

Total travel - the estimates for 1979 produce a forecast of 41.2 billion vehicle-miles of travel in Ontario. This is an increase of 123 percent over the total of 18.5 billion miles for all vehicles in 1959. This provides a 20-year growth factor of 2.23.

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* Forecasting for Highways, The Record and the Outlook, Highway Research Board, Bulletin 257, National Academy of Sciences - National Research Council, Publication 766, Washington D.C., 1960, page 15.

More detailed results of the travel forecast are listed in Table I.

3. PROCEDURES USED IN ESTIMATING MOTOR-VEHICLE TRAVEL

According to the statement of V. Lewis Bassie* "...the essence of a sound approach to forecasting is common-sense analysis of the important forces making for economic change." He continues: "In this approach, as in any other, judgment is one of the prime requisites. Two others are information and analysis. All three are, of course, interacting."

The data obtained from numerous sources (various government departments, automobile manufacturers, oil companies, Automotive Transport Association, Canadian Automobile Chamber of Commerce, etc.) exhibit inconsistencies in detail which are the result of the variable margins of error inherent in motor vehicle statistics. For example, the values for the average annual mileage and miles per gallon of gasoline for passenger cars and commercial vehicles represent a compromise solution in which divergencies in estimates and of opinions on the basic information were resolved, sometimes by averaging and sometimes by the exercise of judgment. Often, it was necessary to choose from among conflicting estimates.

In forecasting on motor-vehicle travel one must deal with average values. "Average" means any measure of central tendency. It is a known fact that "average" values for motor-vehicle mileages of travel and miles per gallon of motor fuel are not available from official sources as accurate figures, as is the case in motor-vehicle registration or total gasoline consumption (for all motor vehicles) for instance. It is necessary to assign these average values arbitrarily. However,

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* Bassie, V. Lewis, Director, Bureau of Economic and Business Research, University of Illinois, Economic Forecasting, McGraw-Hill Book Company, Inc., New York, Toronto, London, 1958 p. 3 - 4.

special effort was made in this study to select amounts that were reasonable. This was done with data and informed opinions obtained from numerous sources, mentioned in this report.

In general, the prediction in this study consists of the integrated product of several analyses of variable intensity of the individual factors of motor-vehicle travel components. In some cases the predicted values of travel components were determined by the method, which implicated a decision about the future in terms of past experience and present know-how with the problems at hand.

4. POPULATION

From 1949 to 1959 the total provincial population increased from 4,378,000 to 5,952,000 as indicated in Table V and as illustrated on Chart I.

Projection of these figures indicates that Ontario's population is likely to be 7,525,000 in 1969, a gain of 26 percent over 1959 - 2.3 percent compound annual growth rate. It is expected also that the provincial population should reach 9,855,000 by 1980, a gain of nearly 66 percent over 1959 - 2.4 percent compound annual growth rate.

In the present study, the population predictions are adjusted to the figures in the September 1957 report of the Ontario Department of Economics and Federal and Provincial Relations (known as the Ontario Department of Economics).*

Comparison makes it evident that the percent error between the population predictions made by the Ontario Department of Economics and the actual population figures for the years 1957, 1958 and 1959 is very insignificant. However, the Ontario Department of Economics states that its future

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* "Population Projections for the Economic Regions, Counties and Urban Areas of Ontario, 1956 to 1976", Ontario Department of Economics, September, 1957.

population figures are arbitrary (because of migration mainly) and that there may be considerable deviation between the predicted estimates and actual population figures.

5. MOTOR VEHICLE REGISTRATION

Table VI and Chart II illustrate the historical and predicted trends in motor-vehicle registration for the Province during the years from 1945 to 1980, inclusive. Chart III presents the population and motor-vehicle registration trends over the longer period, from 1921 to 1980.

The upsurge in Ontario's motor-vehicle registration after the Second World War is partially due to increased population, but it was enhanced by a concurrent increase in the rate of motor-vehicle ownership. This in turn was due to a backlog of desire to own a motor vehicle as well as due to the availability of cars. In 1959 there was one motor vehicle for each 3 persons in Ontario. There was one passenger car and one commercial vehicle for each 3.6 and 18.8 persons respectively. In 1945 there was one motor vehicle for 6.0 persons, and a passenger automobile and a commercial vehicle for each 7.2 and 40.0 persons respectively.

Vehicles registered in Ontario have increased by 199 percent since 1945, rising from 657,000 to 1,963,000 in 1959. Passenger car registration increased from 557,000 to 1,647,000 a gain of 196 percent. The commercial vehicle registration in 1959 shows 316,000, an increase of 216 percent from 100,000 in 1945.

As demonstrated in the table on the following page, the registration of commercial vehicles from 1945 to 1953 increased at a faster rate than that of passenger cars. With the end of the Second World War in 1945, the pent-up demand for motor-vehicle travel, and especially for commercial vehicle transportation, was released. The favourable contri-

butory post-war economic factors and political conditions have exerted such an impact on motor-vehicle registration and travel that this growth in registration could scarcely be considered normal. From 1953 to date, however, the registration of commercial vehicles has grown at a slower rate than passenger cars.

Year	PASSENGER CARS			COMMERCIAL VEHICLES		
	Registration	% Increase	Average Annual Growth Rate	Registration	% Increase	Average Annual Growth Rate
1945	557,000	-	-	100,000	-	-
1952	1,035,000	86%	9.3%	244,000	144%	13.6%
1953	1,131,000	-	-	262,000	-	-
1959	1,647,000	46%	6.4%	316,000	21%	3.1%

This slowdown of percentage increase in the registration of commercial vehicles since 1953 is evident in Table VI.

The slow rate of the annual increase in commercial vehicle registration can be explained as follows:

(a) The post-war demand of commercial trucks during 1945 - 1953 reached its saturation point.

(b) Some industries changed the operation of their trucks from day-time to night-time. The number of trucks in operation is reduced, but efficiency of operation is considerably increased - distribution of motor fuel to service stations, for instance.

(c) A larger size of trailers, i.e. greater capacity of loading and increased commercial vehicle gross weight.

(d) The increased use of piggyback services - railroad transport of highway trailers, started in Canada by the Canadian National Railways in 1952 and by the Canadian Pacific Railway Company in 1957.

The piggyback is experiencing a steady growth in its operation and has reduced heavy tractor-trailer travel over long distance routes. There is an indication that the piggyback expansion has just begun. To date only Plan I and II of piggyback services is in operation.* In fact, Plan I is the least profitable of the five plans. There is an expectation that Plan III, IV, and V which have not been tried in Canada, will create favourable prospects for a piggyback boom in this country. For this reason a trend of piggyback services is still in the process of establishing itself.

6. DENSITY OF MOTOR-VEHICLE OWNERSHIP

A detailed comparison has been made of motor-vehicle ownership ratios in Ontario, the U. S. A. and a number of selected states in the U. S. A. and two states adjacent to Ontario - Table III and Chart VII.

The density of motor-vehicle ownership may be expressed either as a figure indicating the number of people per motor

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* Plan I is the arrangement under which the railways carry the trailers of motor common carriers. The railway provides flatcar and performs the rail haul.

Under Plan II, the railway owns the trailers as well as flatcars and provides all the service.

In Plan III, the railways carry trailers owned by the industry. The railroad provides the flatcar and performs the rail haul.

In Plan IV, both trailers and flatcars are owned by the shipper.

Plan V consists of joint rail-truck rates.

vehicle or number of vehicles per 100 persons. All types of motor vehicles having four wheels or more, and the total population, are included.

The density of motor-vehicle ownership cannot be derived independently, but must be calculated, using total population and motor-vehicle registration figures.

Studying the past trends in population and motor-vehicle registration from 1921, it was found that some abnormal fluctuations in economic conditions and major international conflicts interrupted existing trends, and gave impetus to new ones. (See Charts III and IV.)

Undoubtedly the economic depression of the 1930's and World War II have caused curves of motor-vehicle registration and population to be entirely different from what they would have been, had normal times prevailed.

In the post-war years Ontario and the U.S.A. both experienced a considerable up-trend in population growth and motor-vehicle registration as a result of favourable economic conditions. (As is shown in Charts III and IV.)

Although the average living standard in Ontario and Canada approaches that of the U.S.A., a gap between the per capita wealth in Ontario and in the U.S.A. still exists. This is one of the reasons that the average motor-vehicle ownership per capita in Ontario has been lower in the past and may continue so in the future.

As is depicted on Chart VII, a study of this problem indicates that Ontario may expect a density of motor-vehicle ownership to reach 2.44 people per vehicle or 40.92 vehicles per 100 persons by 1980. (See Charts V and VI also.) A levelling-off of the density of ownership motor-vehicle in Ontario does not indicate a level of 2.0 persons per vehicle by 1975 or before 1980.

7. GASOLINE CONSUMPTION

The records on gasoline consumption obtained from the Gasoline Tax Branch of the Ontario Treasury Department for the years from 1945 to 1959 apply strictly to the net imperial gallonage of taxable gasoline.

It is impossible to give a breakdown of motor fuel into types - gasoline, diesel fuel and propane used for propulsion of motor vehicles, for the following reasons:

(a) Lists such as "Ontario Motor Vehicle Registrations, Driver's Licences, etc." do not indicate the number of commercial motor vehicles that operate on diesel fuel.

(b) The study titled "Commercial Motor Vehicle and Trailer Registrations in Ontario", prepared in January 1960 by the Research Branch of the Ontario Department of Transport, gave a breakdown by registered gross weight and by the type of fuel used for the year 1956 only.

(c) The Gasoline Tax Office compiles only totals on diesel fuel which combine diesel fuel used in connection with the construction or maintenance of roads, etc., and for propulsion of motor vehicles.

For this study there is a need of records on diesel fuel used for propulsion of motor vehicles only. Such statistics are not available at present. For this reason, it is impossible to analyze commercial motor vehicles propelled by diesel fuel.

Some passenger cars are operated on diesel fuel. There are not any available statistics or data as to the number of such cars imported into Ontario; it is assumed however, that the number of such automobiles is insignificant.

The past and future trends of gasoline consumption are shown on Tables VII, IX and on Charts VIII, IX and X.

At present it is impossible to predict the extent of the use of "small cars" - British and other European imports, and "compact cars" - passenger vehicles introduced by the American automobile manufacturers in the autumn of 1959. The tariff policies will play an important role regarding the import of British and other European cars. A few more years will decide about the future of compact cars. It will depend on the individual and family needs, initial purchasing capacity, the appearance of a car, durability and road behaviour, cost of upkeep, resale value, etc.

The impact of small European and compact cars is causing highway forecasters to scale down their predictions of future increases in gasoline demand.

According to the oil economists, there is an expectation that the standard U.S. cars will become smaller and more efficient during the next 5 years.

The actual recorded figures in imperial gallons of net gasoline consumption, furnished by the Gasoline Tax Office, Department of Treasury Ontario, are as follows:

1957 - 1,056,219,000
1958 - 1,103,357,000
1959 - 1,163,392,000

Divergences between predicted and actual recorded gasoline consumption are: in 1957 +1.3%, in 1958 +4.2% and in 1959 +5.7%.

According to the Highway Research Board, Bulletin 257, "... a 5 percent overestimate of state motor fuel tax revenue... might be entirely inacceptable because it would seriously overestimate the amount of revenue that would be available to meet

existing commitments for maintenance, operation and debt services."*

Since time alone cannot determine the growth in gasoline consumption, in this study an equation was computed based on the relation between motor-vehicle registration and gasoline consumption. "The trend is more completely lacking in causal significance, because time itself can hardly be regarded as a force that will produce dependable changes in the future."**

If there is a prediction for motor-vehicle registration for a certain year, the gasoline use for that year can be determined. Motor-vehicle registration was used as a first independent variable. The procedure used in this study reveals a highly significant correlation ($R = 0.997$) among the three variables - gasoline consumption, motor-vehicle registration and time.

Using the multiple regression equation for the prediction of the total gasoline consumption in thousands of gallons, based upon historical trend from 1945 to 1959, it was found that:

$$X_1 = 90{,}879 + 266\ X_2 + 36{,}237\ X_3,$$ where:

X_1 = total annual gasoline consumption in thousands of gallons;

X_2 = annaul motor-vehicle registration in thousands;

X_3 = number of years.

In summarizing the result the following conclusions were reached:

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* Forecasting for Highways, op. cit., p. 12 - 13.

** Bassie, V. Lewis, op. cit., p. 78.

(a) Using the above equation, the revised estimate of gasoline consumption for 1957, 1958 and 1959 came much closer to the recorded ("true") gasoline consumption figure than the one previously estimated - see Chart IX.

(b) The standard deviation for estimates of gasoline consumption in this study works out to ± 14.94 million gallons (± 22.02 million gallons in the earlier report).

(c) The predicted gasoline consumption for the year 1980 amounts to 2,493,000,000 imperial gallons.

In this study the calculation indicates 1,717,921,000 gallons of gasoline for passenger cars and 775,079,000 gallons for commercial vehicles, considering the predicted registration of 3,466,000 passenger automobiles and 655,000 commercial motor vehicles in 1980.

8. MILES PER GALLON FOR PASSENGER CARS AND COMMERCIAL VEHICLES

Average travel in vehicle-miles per gallon of motor-fuel is related to four groups of factors:

(a) the vehicle itself (weight, load - for commercial vehicles, engine characteristics, type of transmission, etc.),

(b) the road and traffic condition (urban streets, open highways, type of road surface, etc.),

(c) the atmospheric condition (seasons, weather, temperature, etc.), and

(d) the individual driver (his experience, skill, habits, interest in vehicle maintenance, and speed at which he drives his vehicle).

Average miles-per-gallon factors of motor-fuel for passenger cars, commercial motor vehicles and all motor vehicles for selected years are shown in Table II.

Studies conducted by the Imperial Oil Limited reveal that a gallon of 1958 gasoline performed 50 percent more work than a gallon of 1930 gasoline, the unit used is ton-miles per gallon — the number of miles that a gallon of gasoline will move a ton of automobile. It was further found that 1958 regular grade gasoline was equal to the premium gasoline in 1953.

The Toronto Daily Star, in co-operation with Mr. William Wallace, Professional Engineer and Professor of Mechanical Engineering at the University of Toronto, conducted carefully controlled tests for several weeks on the various individual, popular in Ontario, automobile makes of 1960 and 1961 models. Speaking in terms of "tank mileage" — that is, the average day-to-day use obtained with a reasonable mixture of urban and highway driving, the following breakdown gives a rough comparison of the miles per gallon of gasoline depending on the make and year of a car:

(a) Standard automobiles..................	13-20 mpg
(b) North American compacts..............	20-26 mpg
(c) European compacts - "small cars"......	26-37 mpg

In 1958 European compact cars accounted for about 18 percent of the total automobile population in Ontario. In 1960 the European and North American compacts rose to the estimated 22 percent of all passenger vehicles registered in Ontario.

All this indicates that as a result the miles-per-gallon factor per passenger car in Ontario did not approach stability contrary to the earlier expectation.

Considering European ("small cars") and North American compact automobiles and a better quality of high-octane motor fuel, motorists are now getting more miles per gallon of gasoline than they did in 1945, and it is assumed that a still greater mileage per gallon of motor fuel will be achieved in 1980 than in 1959.

The latest revised estimates indicate (see Table VII) that for motor vehicles as a whole the average travel in vehicle-miles per gallon of gasoline may increase from 12.49 miles per gallon in 1945 to 17.04 miles per gallon in 1980.

The miles-per-gallon factor according to recent estimates increases from 13.90 per gallon in 1945 to 20.20 miles per gallon per passenger car in 1980, and from 8.55 miles per gallon in 1945 to 10.04 miles per gallon in 1980 per commercial motor vehicle - see Table II.

9. VEHICLE-MILES COMPUTATIONS, PASSENGER CARS AND COMMERCIAL VEHICLES

The estimated average annual mileage per motor vehicle is listed in Table VIII and illustrated in Chart XI. The average travel per vehicle climbed from 5,482 vehicle-miles in 1945 to 7,430 vehicle-miles in 1948, (availability of motor vehicles and fuel - abolishment of restrictions necessitated by war), and to 9,421 vehicle-miles in 1959. This represents an increase of 72 percent over 1945. It is expected that the annual average travel per vehicle should reach 10,309 vehicle-miles by 1980, i.e. a 9.4 percent increase over 1959. This slow-down in growth of the annual average travel per vehicle is caused by multi-vehicle families, urban and suburban traffic congestion, and an increasing use of air transportation, especially for long distance trips.

The average yearly mileage per truck computed by the Dominion Bureau of Statistics for the years 1956 to 1959

inclusive was used in the computation of the average annual vehicle mileage per commercial vehicles. This D.B.S. factor was adjusted for commercial vehicles - trucks plus buses.

Studying all available data and consulting with oil companies and the Canadian Automobile Chamber of Commerce, estimates were computed for the average annual mileage for passenger cars.

In the 1957 report stability at 8,000 average annual miles of travel per passenger car from 1945 to 1980 was assumed. However, for commercial vehicles the estimate of annual travel climbed from 5,280 vehicle-miles in 1945 to 13,259 in 1956 and to 15,099 in 1980.

In the present revision average annual travel in vehicle-miles is estimated as follows:

	1945	1959	1980
Passenger Car........	5,300	9,350	10,012
Commercial Vehicle...	6,500	9,790	11,880
All Motor Vehicles...	5,482	9,421	10,309

The percentage relationship between commercial vehicles and all motor vehicles, as well as between passenger cars and all motor vehicles, in registration, gasoline consumption and travel in vehicle-miles for the years 1957 and 1958 were compared with U.S. estimates. Very close agreement was found between the two sets of estimates - see Table IV.

It is necessary to emphasize that the present revised estimates have been arrived at independently of U.S. estimates. It is striking that in the two independent sets of estimates, using different methods, the percentage relation is almost very similar in both instances.

Table IX presents a summary of records and projections of population, motor vehicle registration and use.

The procedure by which vehicle-miles were determined year by year from 1945 to 1980 for the two major vehicle types - passenger cars and commercial vehicles - was as follows:

- Passenger car registration (column 3, Table IX) was multiplied by the estimated average annual travel to produce total passenger car travel by years in millions of vehicle-miles (column 12, Table IX).

- Commercial vehicle registration (column 4, Table IX) was multiplied by the estimated average annual travel to produce total commercial vehicle travel by years in millions of vehicle-miles (column 13, Table IX).

- The total travel of passenger cars and commercial vehicles, combined, represents total motor vehicle travel in M.V.M. and is shown in column 14, Table IX.

- Total passenger car travel divided by estimated miles-per-gallon factor for a given year represents gasoline consumption for passenger cars in that year (column 9, Table IX).

- Passenger car gasoline gallonages subtracted from the total Ontario gasoline consumption (column 11) gives commercial vehicle gasoline consumption (column 10, Table IX).

Gasoline consumption and travel in vehicle-miles, both total and by vehicle types, are illustrated graphically on Charts VIII and XII respectively.

10. TOTAL MOTOR-VEHICLE TRAVEL

Since 1945 Ontario has experienced tremendous increases in total motor-vehicle travel as a result of growth in the three chief basic factors (population, motor-vehicle registrations, and miles of travel per vehicle or gasoline consumption per vehicle) which have a direct and controlling effect on motor-vehicle travel. It should not be forgotten that the availability of motor vehicles and gasoline also played an important role in the growth of total motor-vehicle travel in the post-war years. The total estimated motor-vehicle travel in Ontario increased from 3,602 million vehicle-miles in 1945 to 18,493 m.v.m., in 1959. This is an increase of 413 percent, or 12.4 compounded annually.

Estimates of future total motor vehicle travel are as follows:

1969 - 28,966 m.v.m., a 57% increase or 4.6% CAGR* over 1959;
1979 - 41,205 m.v.m., a 123% increase or 4.1% CAGR over 1959;
1980 - 42,483 m.v.m., a 130% increase or 4.0% CAGR over 1959.

Estimated passenger car travel in 1959 was 115,399 m.v.m., an increase of 422 percent (12.6% C.A.G.R.) over the 2,952 m.v.m., in 1945. The prediction indicates that there should be 34,702 m.v.m., in 1980, a gain of 125 percent (4.0% C.A.G.R.) over 1959. (See Table I).

The estimate for total motor-vehicle travel in 1957 was compared with that obtained independently in another study - the Needs Study of Ontario's Roads and Streets.** The results in both are identical - 16.44 million vehicle miles of motor vehicle travel in 1957.***

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* C.A.G.R. - Compound annual growth rate.

** Ontario's Roads and Streets, A Report to the Government of Ontario, December 1958, page 11.

*** In the published report - needs study - the figure is rounded to an even 16 billion vehicle miles.

The historical and predicted trend in motor vehicle travel is shown in Table IX and on Chart XII.

11. POSTSCRIPT

Future motor-vehicle travel estimates are essential in the preparation of long-range plans for highway development. For this reason, checking and revising the predictions in the field of highways is of significant importance. Sometimes changes involved in this or other factors need to be measured. The limits of acceptability of error against which the predictions for each individual travel components are to be measured, must be determined in each particular case.

The aim of forecasting is to establish, as accurately as possible, the probable trend in motor-vehicle components based on all data available. Errors are inherent in every forecast. However, an attempt should be made to ensure that the deviation between predicted values and realization will be within tolerable limits of error. The travel predictions cannot be precise estimates for the next 20 years but rather, they should be guides to follow, on which highway engineers can base their decisions in highway planning. The forecasts must be revised continually as more motor-vehicle travel data becomes available and new trends become evident.

It is a matter of sound policy for the Department of Highways Ontario to make a periodic review of travel predictions and related items, and adjust them in the light of current developments.

The periodic reviews of the travel predictions, and use of the results of scientifically designed motor-use surveys, as well as application of improved methods of assembling, processing and interpreting data will help to arrive at a

rational, detailed prediction.

A great benefit could be obtained from more detailed motor-vehicle statistics. The registration figures of motor vehicles by make of car will help to establish a miles-per-gallon factor more efficiently. Also the distribution of government commercial motor vehicles into gross weight groups will enable to analyze the past and future trends of commercial vehicle registration and travel by gross weight classes.

It should be apparent that there is not adequate information on the relative accuracy of present methods. The need for more research in the methodology of the forecasting field is still vitally important.

12. BASIC SOURCES OF STATISTICAL DATA

1. POPULATION

Historical Record: "Population of Canada by Provinces, 1921 - 1959 - Estimated as of June 1 for Intercensal Years", Catalogue No. 91 - 201, Dominion Bureau of Statistics.

Projection: "Population Projections for the Economic Regions, Counties and Urban Areas of Ontario 1956 to 1976", Ontario Department of Economics, September, 1957.

2. MOTOR-VEHICLE REGISTRATIONS

Historical Record: "Ontario Motor Vehicle Registration, Drivers' Licences, etc.", Ontario Department of Highways, Motor Vehicles Branch, 1945 - 1956, Ontario Department of Transport, Motor Vehicles Branch, 1957 - 1959.

3. AVERAGE POPULATION FOR MOTOR VEHICLE AND PASSENGER CAR

Historical Record: "Facts and Figures of the Automotive Industry", Canadian Automobile Chamber of Commerce, 1945 - 1959.

4. GASOLINE CONSUMPTION

Historical Record: Ontario Treasury Department, Gasoline Tax Branch.

5. MILES-PER-GALLON FACTORS FOR COMMERCIAL VEHICLES

"Motor Transport Statistics for the Province of Ontario", Dominion Bureau of Statistics, 1956 - 1958.

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TABLES

TABLE I

SUMMARY OF THE RESULTS OF ONTARIO PREDICTION OF POPULATION, MOTOR-VEHICLE OWNERSHIP, REGISTRATION, GASOLINE CONSUMPTION AND VEHICLE-MILES OF TRAVEL FOR THE SELECTED YEARS FROM 1959 TO 1980.

YEAR	POPULATION	RATIO: S/B YEAR*	COMPOUND ANNUAL GROWTH OVER 1959
	(Thousands)		*(%)*
1959	5,952	1.00	—
1964	6,688	1.12	2.3
1969	7,525	1.26	2.3
1974	8,540	1.43	2.4
1979	9,630	1.62	2.4
1980	9,855	1.66	2.4

VEHICLES and SELECTED YEARS	DENSITY OF VEHICLE OWNERSHIP					VEHICLE REGISTRATION		
	POPULATION PER VEHICLE	RATIO: S/B YEAR	VEHICLES PER 100 PERSONS TOTAL POPULATION	RATIO: S/B YEAR	COMPOUND ANNUAL GROWTH OVER 1959	THOUSANDS OF VEHICLES	RATIO: S/B YEAR	COMPOUND ANNUAL GROWTH OVER 1959
					(%)			(%)
PASSENGER CARS								
1959	3.6	1.00	27.67	1.00	—	1,647	1.00	—
1964	3.2	0.89	31.20	1.13	2.4	2,087	1.27	4.8
1969	3.0	0.83	33.45	1.21	1.9	2,517	1.53	4.3
1974	2.9	0.80	34.51	1.25	1.5	2,947	1.79	4.0
1979	2.8	0.78	35.10	1.27	1.2	3,380	2.05	3.6
1980	2.8	0.78	35.17	1.27	1.1	3,466	2.10	3.6
COMMERCIAL VEHICLES								
1959	18.8	1.00	5.31	1.00	—	316	1.00	—
1964	18.2	0.97	5.49	1.03	0.7	367	1.16	3.0
1969	17.6	0.94	5.69	1.07	0.7	428	1.35	3.0
1974	16.3	0.87	6.15	1.17	0.9	525	1.66	3.5
1979	15.2	0.81	6.59	1.24	1.1	635	2.01	3.5
1980	15.0	0.80	6.65	1.25	1.0	655	2.07	3.5
MOTOR VEHICLES								
1959	3.0	1.00	32.98	1.00	—	1,963	1.00	—
1964	2.7	0.90	36.69	1.11	2.1	2,454	1.25	4.6
1969	2.6	0.87	39.14	1.19	1.7	2,945	1.50	4.1
1974	2.5	0.83	40.65	1.23	1.4	3,472	1.77	3.9
1979	2.4	0.80	41.69	1.26	1.2	4,015	2.04	3.6
1980	2.4	0.80	41.82	1.27	1.1	4,121	2.10	3.6

VEHICLES and SELECTED YEARS	GASOLINE CONSUMPTION			MOTOR-VEHICLE ANNUAL TRAVEL		
	THOUSANDS OF GALLONS	RATIO: S/B YEAR	COMPOUND ANNUAL GROWTH OVER 1959	MILLIONS OF VEHICLE-MILES	RATIO: S/B YEAR	COMPOUND ANNUAL GROWTH OVER 1959
			(%)			(%)
PASSENGER CARS						
1959	823,476	1.00	—	15,399	1.00	—
1964	1,019,077	1.24	4.3	19,872	1.29	5.2
1969	1,223,317	1.49	4.0	24,344	1.58	4.7
1974	1,440,497	1.75	3.8	28,954	1.88	4.3
1979	1,677,711	2.04	3.6	33,722	2.19	4.0
1980	1,717,921	2.09	3.5	34,702	2.25	4.0
COMMERCIAL VEHICLES						
1959	339,916	1.00	—	3,094	1,00	—
1964	448,923	1.32	5.7	3,780	1.22	4.1
1969	556,683	1.64	5.1	4,622	1.49	4.1
1974	661,503	1.95	4.6	5,927	1.92	4.4
1979	750,289	2.21	4.2	7,483	2.42	4.5
1980	775,079	2.28	4.0	7,781	2.51	4.5
MOTOR VEHICLES						
1959	1,163,392	1.00	—	18,493	1.00	—
1964	1,468,000	1.26	4.7	23,652	1.28	5.1
1969	1,780,000	1.53	4.3	28,966	1.57	4.6
1974	2,102,000	1.81	4.0	34,881	1.89	4.3
1979	2,428,000	2.09	3.8	41,205	2.23	4.1
1980	2,493,000	2.14	3.7	42,483	2.30	4.0

* *S/B YEAR = Selected/Basic Year*

TABLE II

PROVINCE OF ONTARIO

MOTOR VEHICLE TRAVEL FACTORS

ITEM	SELECTED CALENDAR YEAR		
	1945	1959	1980
AVERAGE ANNUAL TRAVEL PER VEHICLE (IN VEHICLE MILES)			
Passenger Cars	5,300	9,350	10,012
Commercial Vehicle	6,500	9,790	11,880
All Motor Vehicles	5,482	9,421	10,309
AVERAGE TRAVEL IN VEHICLE-MILES PER GALLON OF GASOLINE (Mi/Gal)			
Passenger Cars	13.90	18.70	20.20
Commercial Vehicle	8.55	9.10	10.04
All Motor Vehicles	12.49	15.89	17.04

TABLE III

COMPARATIVE STATISTICS

PROVINCE OF ONTARIO, UNITED STATES OF AMERICA, STATE OF MICHIGAN, STATE OF NEW YORK.

I. POPULATION

	1920			1945			1956			1976			1980		
	POPULATION IN '000	INDEX*	C.A.G.R.** OVER 1920 %	POPULATION IN '000	INDEX	C.A.G.R. OVER 1920 %	POPULATION IN '000	INDEX	C.A.G.R. OVER 1920 %	POPULATION IN '000	INDEX	C.A.G.R. OVER 1920 %	POPULATION IN '000	INDEX	C.A.G.R. OVER 1920 %
ONTARIO	2,863	100	–	4,000	139.7	1.4	5,405	188.8	1.8	8,973	313.4	2.1	9,855	344.2	2.1
U.S.A.	105,711	100	–	132,491	125.3	0.9	170,214	161.0	1.4	233,533	220.9	1.4	DATA NOT AVAILABLE		
MICHIGAN	3,668	100	–	5,475	149.3	1.6	7,516	2049	2 1	10,162	277 0	1.8			
NEW YORK	10,385	100	–	12,945	124.6	0.9	16,256	1565	1.3	20,533	197.7	1.3			

II. MOTOR VEHICLE REGISTRATION

	1920			1945			1956			1976			1980		
	REGISTRATION IN '000	INDEX	C.A.G.R. OVER 1920 %	REGISTRATION IN '000	INDEX	C.A.G.R. OVER 1920 %	REGISTRATION IN '000	INDEX	C.A.G.R. OVER 1920 %	REGISTRATION IN '000	INDEX	C.A.G.R. OVER 1920 %	REGISTRATION IN '000	INDEX	C.A.G.R. OVER 1920 %
ONTARIO	172	100	–	657	382 0	5.5	1,698	987.2	6.5	3,690	2145.3	5.6	4,121	2395.9	5.4
U.S.A.	9,239	100	–	31,035	335.9	5.0	65,119	704.8	5.5	113,642	1230.0	4.6	DATA NOT AVAILABLE		
MICHIGAN	413	100	–	1,475	357.1	5.2	3,138	759.8	5.8	4,706	1139.5	4.4			
NEW YORK	676	100	–	2,360	349.1	5.2	4,810	711.5	5.6	7,985	1181 2	4.5			

III. DENSITY OF VEHICLE OWNERSHIP

	1920				1945				1956				1976				1980			
	POPULATION	MOTOR VEHICLES			POPULATION	MOTOR VEHICLES			POPULATION	MOTOR VEHICLES			POPULATION	MOTOR VEHICLES			POPULATION	MOTOR VEHICLES		
	PER VEHICLE	PER 100 PERSONS	INDEX	C.A.G.R. OVER 1920 %	PER VEHICLE	PER 100 PERSONS	INDEX	C.A.G.R. OVER 1920 %	PER VEHICLE	PER 100 PERSONS	INDEX	C.A.G.R. OVER 1920 %	PER VEHICLE	PER 100 PERSONS	INDEX	C.A.G.R. OVER 1920 %	PER VEHICLE	PER 100 PERSONS	INDEX	C.A.G.R. OVER 1920 %
ONTARIO	16.7	6 0	100	–	6 0	16.4	273.3	4.1	3.2	31.4	523.3	4.7	2.43	41.1	685.0	3.5	2.39	41.8	696.7	3.3
U.S.A.	11.5	8.7	100	–	4.3	23.3	267.8	4.0	2.6	38.5	442.5	4 2	2 02	49 5	569.0	3.1	DATA NOT AVAILABLE			
MICHIGAN	9.0	11.1	100	–	3.8	26.3	236.9	3.5	2.4	41.8	376.6	3.8	2.16	46 3	417.1	2.9				
NEW YORK	15.2	6 6	100	–	5.4	18 5	280 3	4.2	3.4	29.6	448.5	4.2	2 57	38 9	589.4	3.2				

NOTE: * Index numbers based on 1920 = 100

** C.A.G.R. = Compound Annual Growth Rate

SOURCE DATA

1. PAST RECORDS

a) **ONTARIO** – Population of Canada by Provinces, Catalogue No. 91–201, Dominion Bureau of Statistics, Ottawa, Ontario.

Ontario Motor Vehicle Registrations, Drivers' Licences, etc., Motor Vehicle Branch, Department of Transport.

b) **U.S.A., MICHIGAN, NEW YORK** – Population data for 1920 and 1945 obtained from the Consulate General of United States of America, Toronto, Ontario.

Motor Vehicle Registration and Vehicle Ownership Ratio taken from "Highway Highway Statistics Summary to 1955," Department of Commerce Bureau of Public Roads, Washington, D.C., 1957

2. PREDICTION

a) **ONTARIO** – "Population Projections for the Economic Regions, Counties and Urban Areas of Ontario 1956 to 1976", Ontario Department of Economics, September, 1957.

Motor Vehicle Registration and Density of Vehicle Ownership — Statistics & Economics Sections, D.H.O., 1960.

b) **U.S.A., MICHIGAN, NEW YORK** – "Forecasts of Population, Motor Vehicle Registrations, Travel, and Fuel Consumption," – "Public Roads, A Journal of Highway Research", Vol. 30, No.2, February, 1960, Bureau of Public Roads, U.S. Department of Commerce, Washington, D.C.

TABLE IV

PROVINCE OF ONTARIO
PASSENGER CAR AND COMMERCIAL VEHICLE DATA EXPRESSED AS A PERCENTAGE OF TOTAL MOTOR VEHICLE DATA

ITEM	PERCENTAGE OF TOTAL MOTOR VEHICLES						
	SELECTED CALENDAR YEARS						
	1945	1950	1957	1958	1959	1970	1980
MOTOR VEHICLE REGISTRATION							
Passenger Cars	84.8	81.4	82.9 (83.4)	83.4 (83.4)	83.9	85.5	84.1
Commercial Vehicles	15.2	18.6	17.1 (16.6)	16.6 (16.6)	16.1	14.5	15.9
VEHICLE OWNERSHIP							
Passenger Cars	84.8	81.4	82.9	83.4	83.9	85.5	84.1
Commercial Vehicles	15.2	18.6	17.1	16.6	16.1	14.5	15.9
GASOLINE CONSUMPTION							
Passenger Cars	73.6	71.3	72.0 (70.9)	73.4 (71.3)	70.8	68.8	68.9
Commercial Vehicles	26.4	28.7	28.0 (29.1)	27.6 (28.7)	29.2	31.2	31.1
TRAVEL IN VEHICLE-MILES							
Passenger Cars	82.0	80.9	82.4 (81.8)	82.8 (82.0)	83.3	84.0	81.7
Commercial Vehicles	18.0	19.1	17.6 (18.2)	17.2 (18.0)	16.7	16.0	18.3

NOTE: For the sake of comparison the 1957 and 1958 U.S. figures for passenger cars and commercial vehicles are shown in brackets. They are expressed as a percentage of the total motor vehicle registration, gasoline consumption, and travel in vehicle-miles.
SOURCE: "Public Road", A Journal of Highway Research, Vol. 30, No. 10, October 1959, Washington, D.C., P. 240 (1957 Data) and Vol. 30, No. 12, February 1960, p. 275, (1958 Data).

PROVINCE OF ONTARIO

TABLE V

TRENDS IN POPULATION

1945 - 1980

YEAR	POPULATION	
	HISTORICAL TREND	YEARLY % INCREASE
1945	4,000,000	----
1946	4,093,000	2.32
1947	4,176,000	2.03
1948	4,275,000	2.37
1949	4,378,000	2.41
1950	4,471,000	2.12
1951	4,598,000	2.84
1952	4,788,000	4.13
1953	4,941,000	3.19
1954	5,115,000	3.52
1955	5,266,000	2.95
1956	5,405,000	2.64
1957	5,622,000	4.01
1958	5,803,000	3.22
1959	5,952,000	2.57
	PREDICTED TREND	% INCREASE FROM 1959
1960	6,089,000	2.30
1961	6,249,000	4.99
1962	6,390,000	7.36
1963	6,540,000	9.88
1964	6,688,000	12.37
1965	6,837,000	14.87
1966	6,990,000	17.44
1967	7,170,000	20.46
1968	7,345,000	23.40
1969	7,525,000	26.43
1970	7,750,000	30.21
1971	7,898,000	32.69
1972	8,100,000	36.09
1973	8,320,000	39.78
1974	8,540,000	43.48
1975	8,760,000	47.18
1976	8,973,000	50.76
1977	9,195,000	54.48
1978	9,415,000	58.18
1979	9,630,000	61.79
1980	9,855,000	65.57

PROVINCE OF ONTARIO

TABLE VI

TRENDS IN MOTOR VEHICLE REGISTRATION

HISTORICAL TREND

YEAR	PASSENGER CARS (IN '000)	YEARLY % INCREASE	COMMERCIAL VEHICLE (IN '000)	YEARLY % INCREASE	TOTAL MOTOR VEHICLES	YEARLY % INCREASE
1945	557	----	100	----	657	----
1946	587	5.38	117	17.00	704	7.15
1947	647	10.22	141	20.51	788	11.93
1948	699	8.04	163	15.60	862	9.39
1949	773	10.59	184	12.88	957	11.02
1950	888	14.88	203	10.33	1,091	14.00
1951	966	8.78	225	10.84	1,191	9.16
1952	1,035	7.14	244	8.44	1,279	7.39
1953	1,131	9.27	262	7.38	1,393	8.91
1954	1,205	6.54	272	3.82	1,477	6.03
1955	1,318	9.38	288	5.88	1,606	8.73
1956	1,401	6.29	297	3.12	1,698	5.73
1957	1,477	5.42	305	2.69	1,782	4.95
1958	1,550	4.94	308	0.98	1,858	4.26
1959	1,647	6.26	316	2.60	1,963	5.65

PREDICTED TREND

YEAR	PASSENGER CARS (IN '000)	COMMERCIAL VEHICLES (IN '000)	TOTAL MOTOR VEHICLES (IN '000)
1960	1,733	323	2,056
1961	1,822	333	2,155
1962	1,910	343	2,253
1963	1,998	355	2,353
1964	2,087	367	2,454
1965	2,170	380	2,550
1966	2,260	394	2,654
1967	2,342	406	2,748
1968	2,430	417	2,847
1969	2,517	428	2,945
1970	2,600	440	3,040
1971	2,682	460	3,142
1972	2,775	480	3,255
1973	2,860	501	3,361
1974	2,947	525	3,472
1975	3,035	550	3,582
1976	3,120	570	3,690
1977	3,210	595	3,805
1978	3,295	616	3,911
1979	3,380	635	4,015
1980	3,466	655	4,121

PROVINCE OF ONTARIO

TABLE VII

TRENDS IN GASOLINE CONSUMPTION

	GASOLINE CONSUMPTION IN THOUSANDS OF GALLONS	
YEAR	HISTORICAL TREND	YEARLY % INCREASE
1945	288,401	----
1946	398,855	38.30
1947	427,384	7.15
1948	468,667	9.66
1949	520,763	11.11
1950	581,146	11.59
1951	642,225	10.51
1952	691,014	7.60
1953	773,404	11.92
1954	824,522	6.61
1955	926,349	12.35
1956	991,774	7.06
1957	1,056,219	6.50
1958	1,103,357	4.46
1959	1,163,392	5.44
	PREDICTED TREND	% INCREASE FROM 1959
1960	1,217,000	4.61
1961	1,280,000	10.02
1962	1,342,000	15.35
1963	1,405,000	20.77
1964	1,468,000	26.18
1965	1,530,000	31.51
1966	1,594,000	37.01
1967	1,655,000	42.26
1968	1,718,000	47.67
1969	1,780.000	53.00
1970	1,842,000	58.33
1971	1,905,000	63.75
1972	1,971,000	69.42
1973	2,036,000	75.00
1974	2,102,000	80.68
1975	2,167,000	86.27
1976	2,233,000	91.94
1977	2,300,000	97.70
1978	2,364,000	103.20
1979	2,428,000	108.70
1980	2,493,000	114.29

PROVINCE OF ONTARIO

TABLE VIII

COMPONENTS OF MOTOR VEHICLE TRAVEL

YEAR	VEHICLE OWNERSHIP MOTOR VEHICLE PER 100 PERSONS	AVERAGE ANNUAL MILEAGE PER MOTOR VEHICLE	MOTOR VEHICLE MILES PER GALLON OF GASOLINE FACTOR
	HISTORICAL TREND		
1945	16.4	5,482	12.49
1946	17.2	7,033	12.41
1947	18.9	7,214	13.30
1948	20.2	7,430	13.67
1949	21.8	7,631	14.02
1950	24.4	7,840	14.72
1951	25.9	8,034	14.90
1952	26.7	8,227	15.23
1953	28.2	8,431	15.19
1954	28.9	8,630	15.46
1955	30.5	8,829	15.31
1956	31.4	9,032	15.46
1957	31.7	9,226	15.56
1958	32.0	9,346	15.74
1959	33.0	9,421	15.89
	PREDICTED TREND		
1960	33.8	9,479	16.01
1961	34.5	9,517	16.02
1962	35.3	9,557	16.04
1963	36.0	9,590	16.06
1964	36.7	9,638	16.11
1965	37.3	9,679	16.13
1966	38.0	9,719	16.18
1967	38.3	9,759	16.20
1968	38.8	9,797	16.23
1969	39.1	9,836	16.27
1970	39.2	9,877	16.30
1971	39.8	9,918	16.37
1972	40.2	9,960	16.45
1973	40.4	10,000	16.51
1974	40.6	10,046	16.59
1975	40.9	10,099	16.69
1976	41.1	10,132	16.74
1977	41.4	10,176	16.83
1978	41.5	10,222	16.91
1979	41.7	10,263	16.97
1980	41.8	10,309	17.04

PROVINCE OF ONTARIO

MOTOR VEHICLE REGISTRATION, OWNERSHIP AND USE

1945 - 1980

TABLE IX

YEAR 1	POP'N IN '000 2	PASS.CAR REG. IN '000 3	COMM. VEH. REG. IN '000 4	MOTOR VEH. REG. IN '000 5	POP'N PER PASS. CAR 6	POP'N PER COMM. VEH. 7	POP'N PER MOTOR VEH. 8	PASS.CAR GAS CONS'N IN '000 GALLONS 9	COMM.VEH. GAS CONS'N IN '000 GALLONS 10	MOTOR VEH. GAS CONS'N IN '000 GALLONS 11	PASS.CAR TRAVEL IN M. V. M. 12	COMM.VEH. TRAVEL IN M. V. M. 13	MOTOR VEH. TRAVEL IN M. V. M. 14	YEAR 15
HISTORICAL TREND														
1945	4,000	557	100	657	7.2	40.0	6.0	212,374	76,027	288,401	2,952	650	3,602	1945
1946	4,093	587	117	704	7.0	35.0	5.8	299,927	98,928	398,855	4,109	842	4,951	1946
1947	4,176	647	141	788	6.5	29.6	5.3	320,138	107,246	427,384	4,642	1,043	5,685	1947
1948	4,275	699	163	862	6.2	26.2	4.9	342,119	126,548	468,667	5,166	1,239	6,405	1948
1949	4,378	773	184	957	5.7	23.8	4.6	373,439	147,324	520,763	5,863	1,440	7,303	1949
1950	4,471	888	203	1,091	5.1	22.0	4.1	414,491	166,655	581,146	6,922	1,632	8,554	1950
1951	4,598	966	225	1,191	4.8	20.4	3.8	453,706	188,519	642,225	7,713	1,856	9,569	1951
1952	4,788	1,035	244	1,279	4.7	19.6	3.7	480,739	210,275	691,014	8,461	2,062	10,523	1952
1953	4,941	1,131	262	1,393	4.4	18.9	3.5	541,257	232,147	773,404	9,472	2,273	11,745	1953
1954	5,115	1,205	272	1,477	4.2	18.8	3.4	577,263	247,259	824,522	10,333	2,414	12,747	1954
1955	5,266	1,318	288	1,606	4.0	18.3	3.3	660,857	265,492	926,349	11,565	2,614	14,179	1955
1956	5,405	1,401	297	1,698	3.9	18.2	3.2	710,395	281,379	991,774	12,574	2,762	15,336	1956
1957	5,622	1,477	305	1,782	3.8	18.4	3.1	760,899	295,320	1,056,219	13,544	2,897	16,441	1957
1958	5,803	1,550	308	1,858	3.7	18.8	3.1	799,111	304,246	1,103,357	14,384	2,981	17,365	1958
1959	5,952	1,647	316	1,963	3.6	18.8	3.0	823,476	339,916	1,163,392	15,399	3,094	18,493	1959
PREDICTED TREND														
1960	6,089	1,733	323	2,056	3.5	18.8	3.0	844,041	372,959	1,217,000	16,290	3,198	19,488	1960
1961	6,249	1,822	333	2,155	3.4	18.8	2.9	890,207	389,793	1,280,000	17,181	3,329	20,510	1961
1962	6,390	1,910	343	2,253	3.3	18.6	2.8	931,392	410,608	1,342,000	18,069	3,463	21,532	1962
1963	6,540	1,998	355	2,353	3.3	18.4	2.8	971,538	433,462	1,405,000	18,945	3,620	22,565	1963
1964	6,688	2,087	367	2,454	3.2	18.2	2.7	1,019,077	448,923	1,468,000	19,872	3,780	23,652	1964
1965	6,837	2,170	380	2,550	3.2	18.0	2.7	1,057,653	472,347	1,530,000	20,730	3,952	24,682	1965
1966	6,990	2,260	394	2,654	3.1	17.7	2.6	1,105,000	489,000	1,594,000	21,658	4,137	25,795	1966
1967	7,170	2,342	406	2,748	3.1	17.7	2.6	1,142,690	512,310	1,655,000	22,511	4,307	26,818	1967
1968	7,345	2,430	417	2,847	3.0	17.6	2.6	1,183,333	534,667	1,718,000	23,430	4,462	27,892	1968
1969	7,525	2,517	428	2,945	3.0	17.6	2.6	1,223,317	566,683	1,780,000	24,344	4,622	28,966	1969
1970	7,750	2,600	440	3,040	3.0	17.6	2.5	1,267,839	574,161	1,842,000	25,230	4,796	30,026	1970
1971	7,898	2,682	460	3,142	2.9	17.2	2.5	1,305,450	599,550	1,905,000	26,109	5,055	31,164	1971
1972	8,100	2,775	480	3,225	2.9	16.9	2.5	1,354,900	616,100	1,971,000	27,098	5,323	32,421	1972
1973	8,320	2,860	501	3,361	2.9	16.6	2.5	1,400,700	635,300	2,036,000	28,014	5,606	33,620	1973
1974	8,540	2,947	525	3,472	2.9	16.3	2.5	1,440,497	661,503	2,102,000	28,954	5,927	34,881	1974
1975	8,760	3,035	550	3,585	2.9	15.9	2.4	1,488,060	678,940	2,167,000	29,910	6,264	36,174	1975
1976	8,973	3,120	570	3,690	2.9	15.7	2.4	1,534,378	698,622	2,233,000	30,841	6,549	37,390	1976
1977	9,195	3,210	595	3,805	2.9	15.4	2.4	1,583,433	716,567	2,300,000	31,827	6,893	38,720	1977
1978	9,415	3,295	616	3,911	2.9	15.3	2.4	1,630,796	733,204	2,364,000	32,779	7,200	39,979	1978
1979	9,630	3,380	635	4,015	2.8	15.2	2.4	1,677,711	750,289	2,428,000	33,722	7,483	41,205	1979
1980	9,855	3,466	655	4,121	2.8	15.0	2.4	1,717,921	775,079	2,493,000	34,702	7,781	42,483	1980

CHARTS

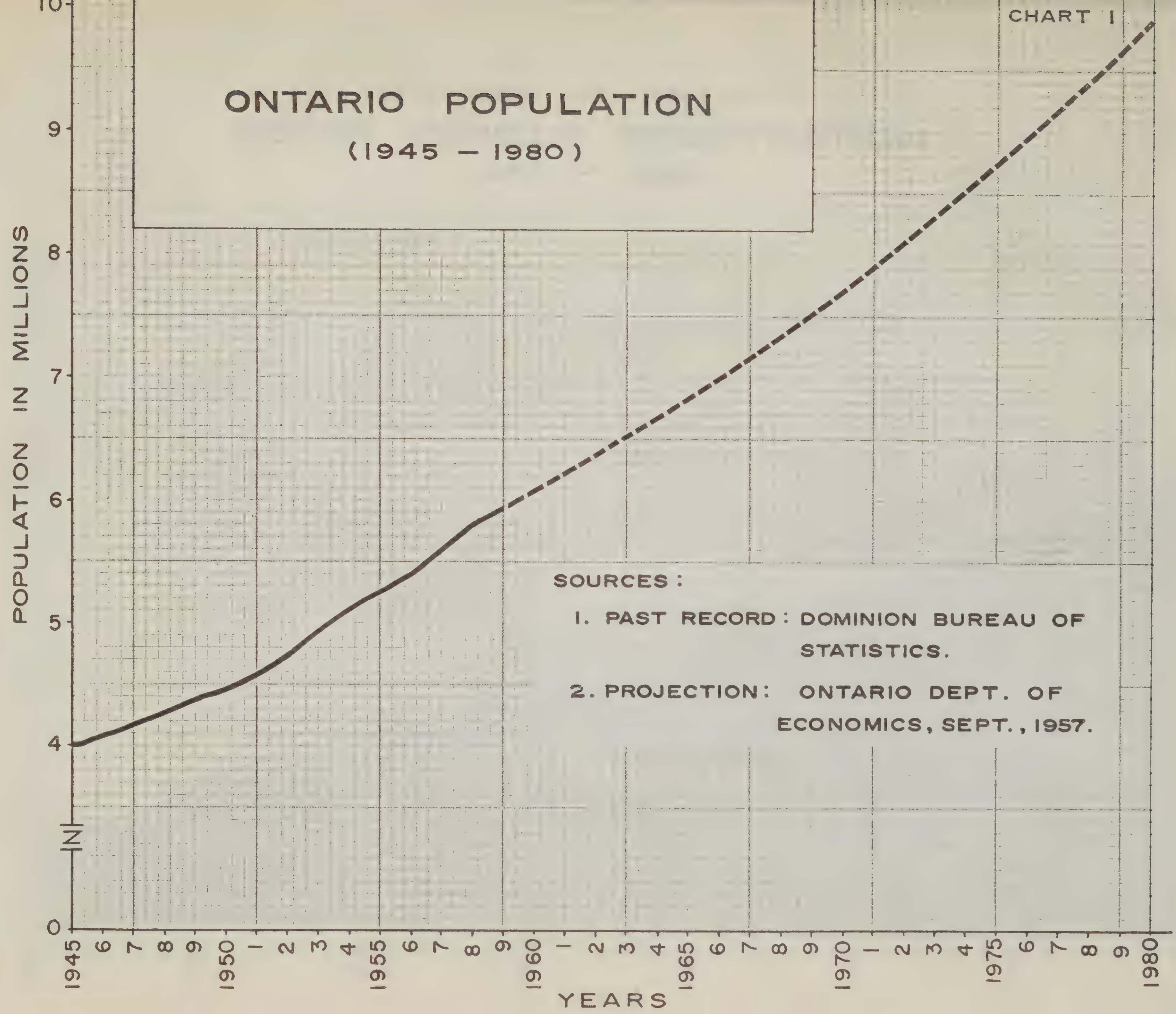


CHART I

ONTARIO POPULATION

(1945 – 1980)

SOURCES:

1. PAST RECORD: DOMINION BUREAU OF STATISTICS.

2. PROJECTION: ONTARIO DEPT. OF ECONOMICS, SEPT., 1957.

CHART II

PROVINCE OF ONTARIO
MOTOR VEHICLE REGISTRATION
1945 — 1980

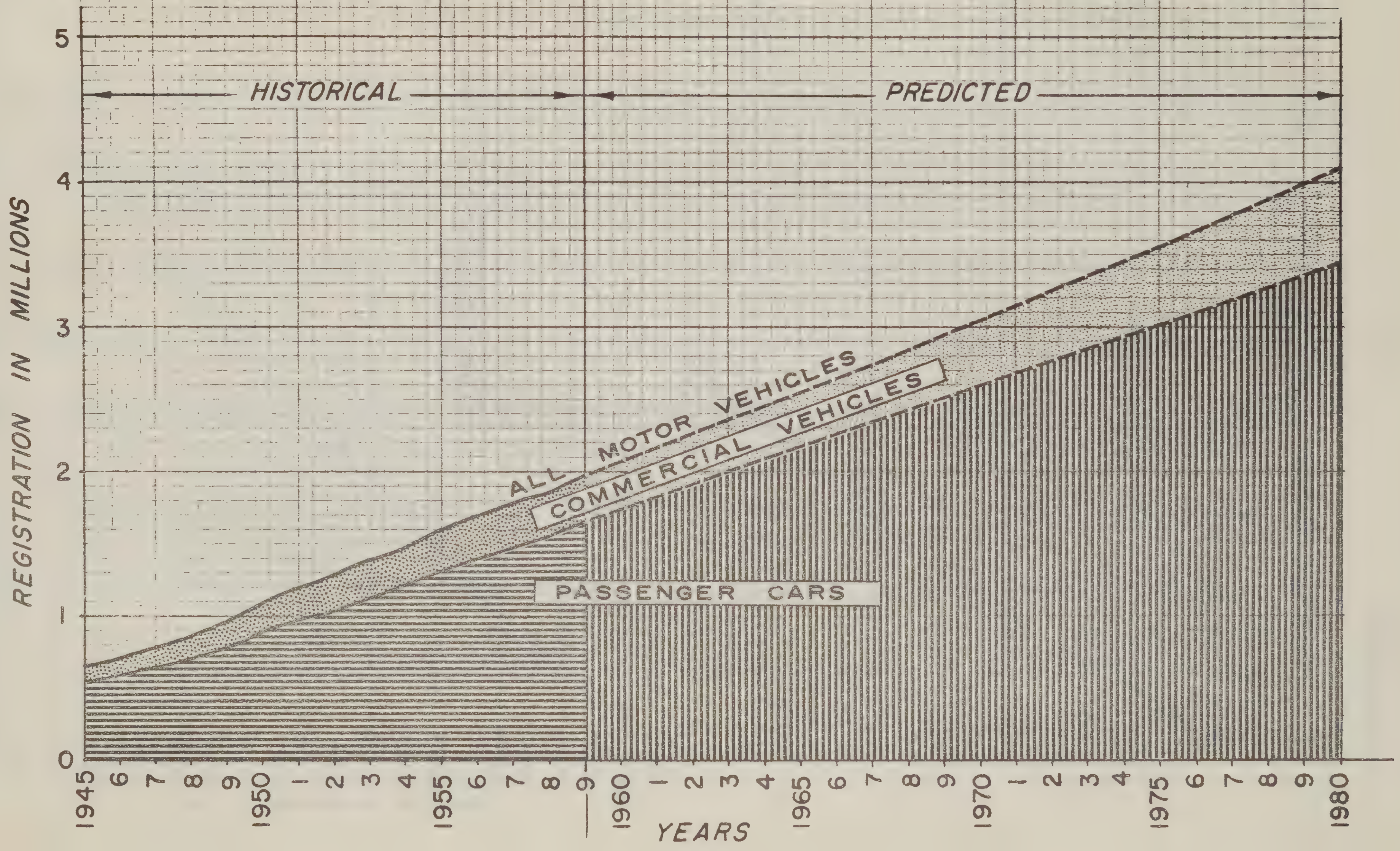


CHART III

PROVINCE OF ONTARIO

POPULATION AND MOTOR VEHICLE REGISTRATION

1921 — 1980

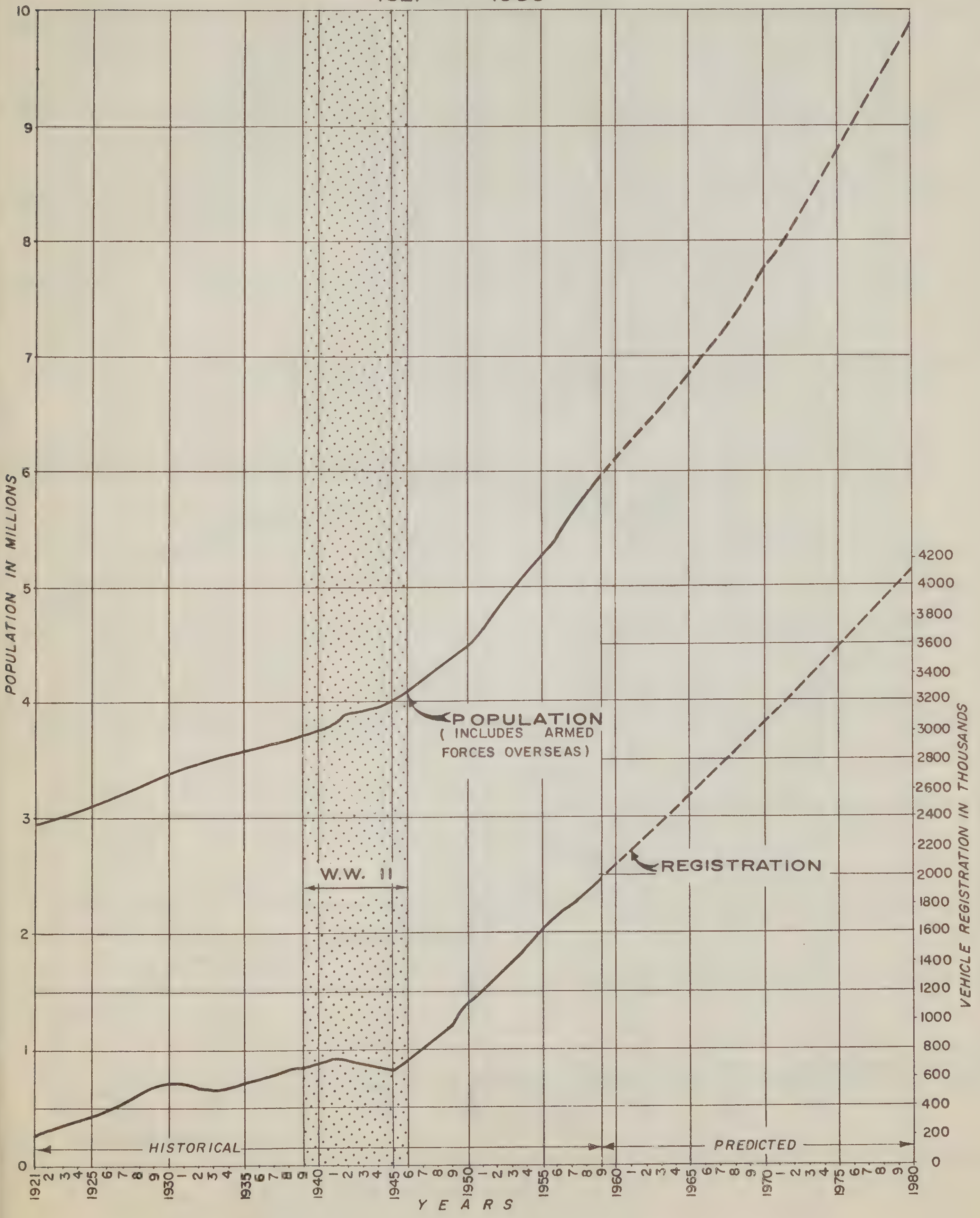
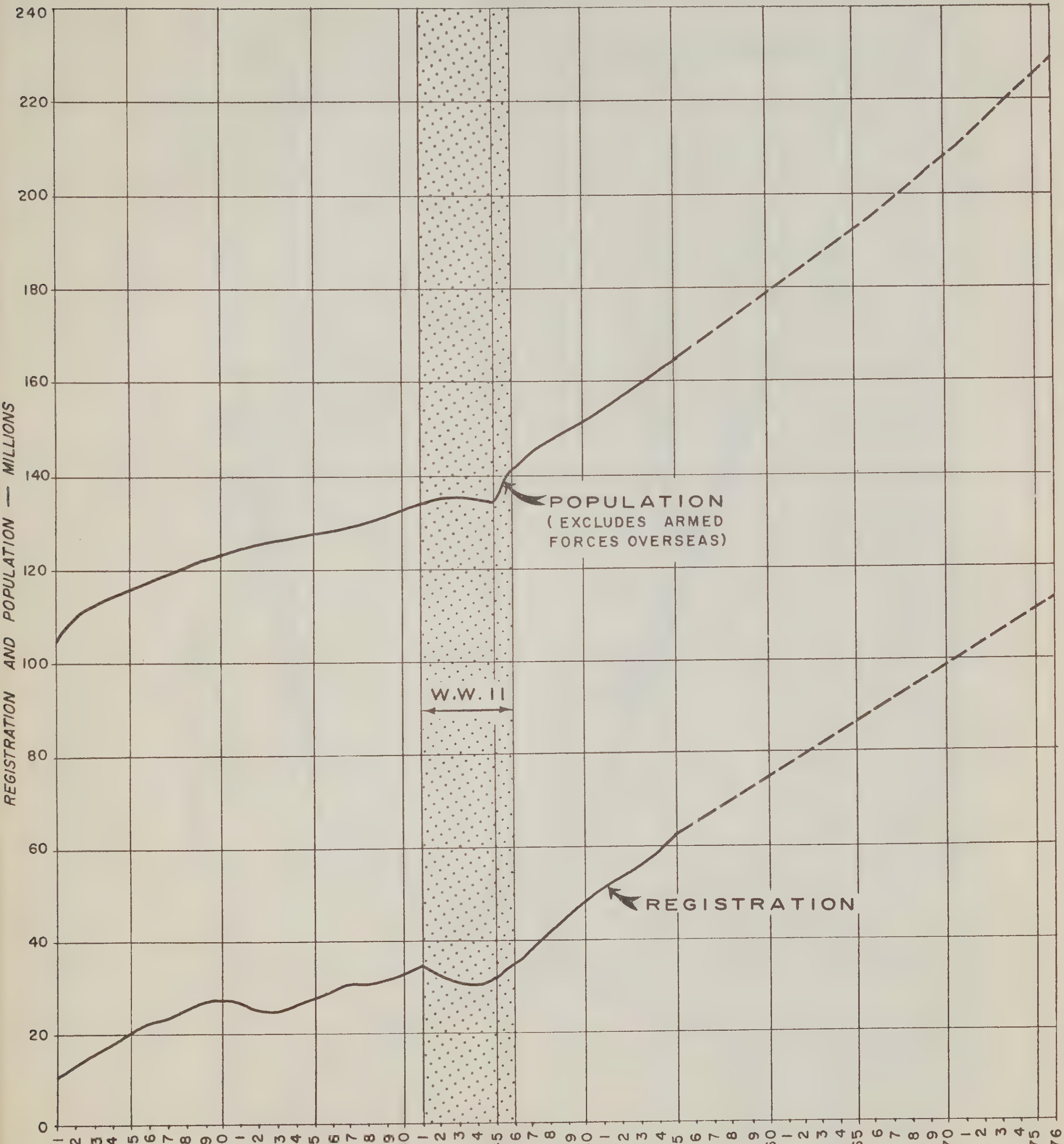


CHART IV

UNITED STATES OF AMERICA

ESTIMATES OF POPULATION AND MOTOR VEHICLE REGISTRATION

1921 — 1976



NOTE: *Alaska and Hawaii not included,*

SOURCE: *"PUBLIC ROADS, A JOURNAL OF HIGHWAY RESEARCH," Vol. 30, No. 12, February 1960, p. 262, figure 1, Bureau of Public Roads, U.S. Department of Commerce, Washington, D.C.*

PROVINCE OF ONTARIO

MOTOR VEHICLE REGISTRATION AND RATIOS OF REGISTERED MOTOR VEHICLES TO POPULATION

1920 — 1980

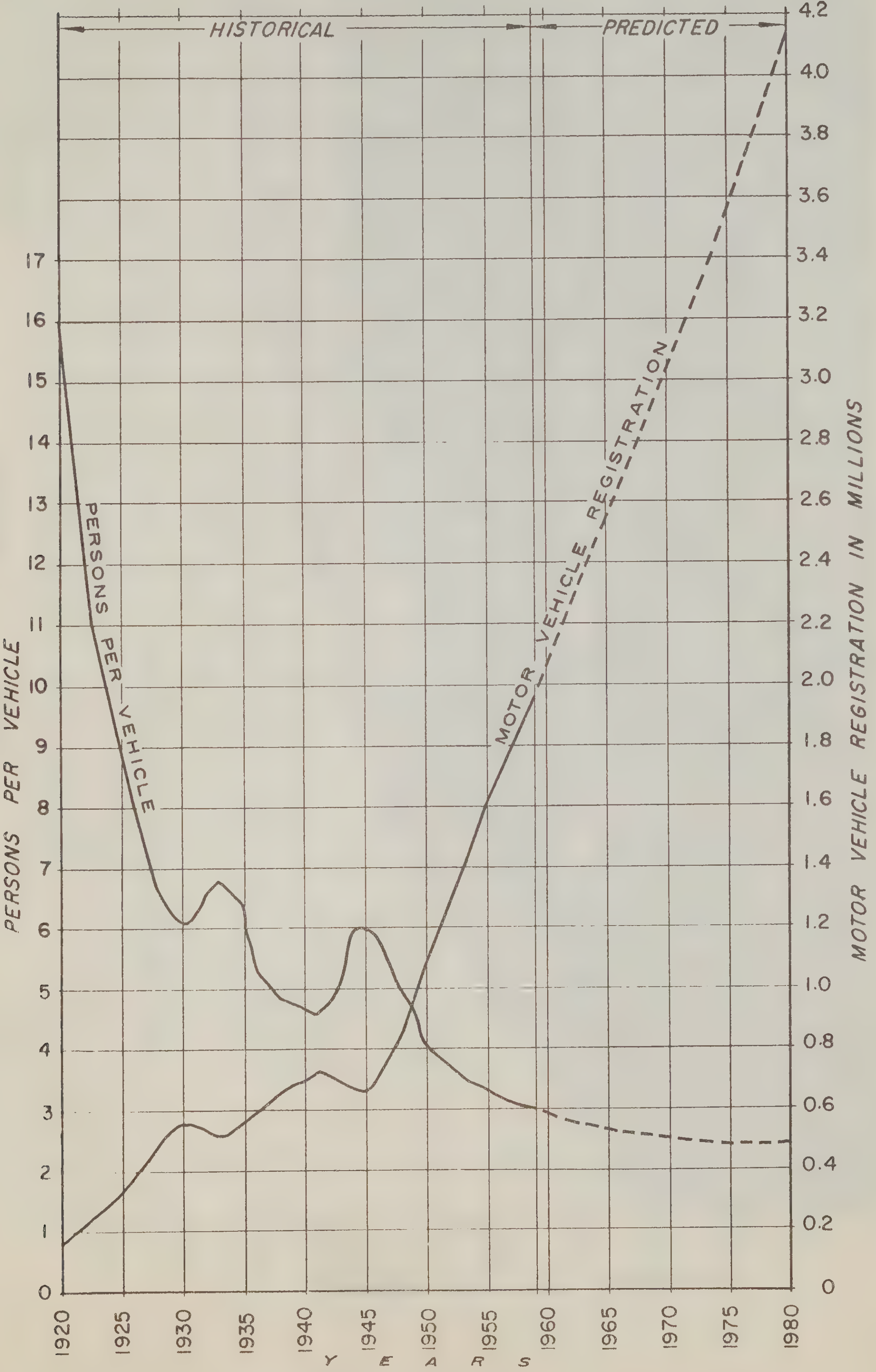
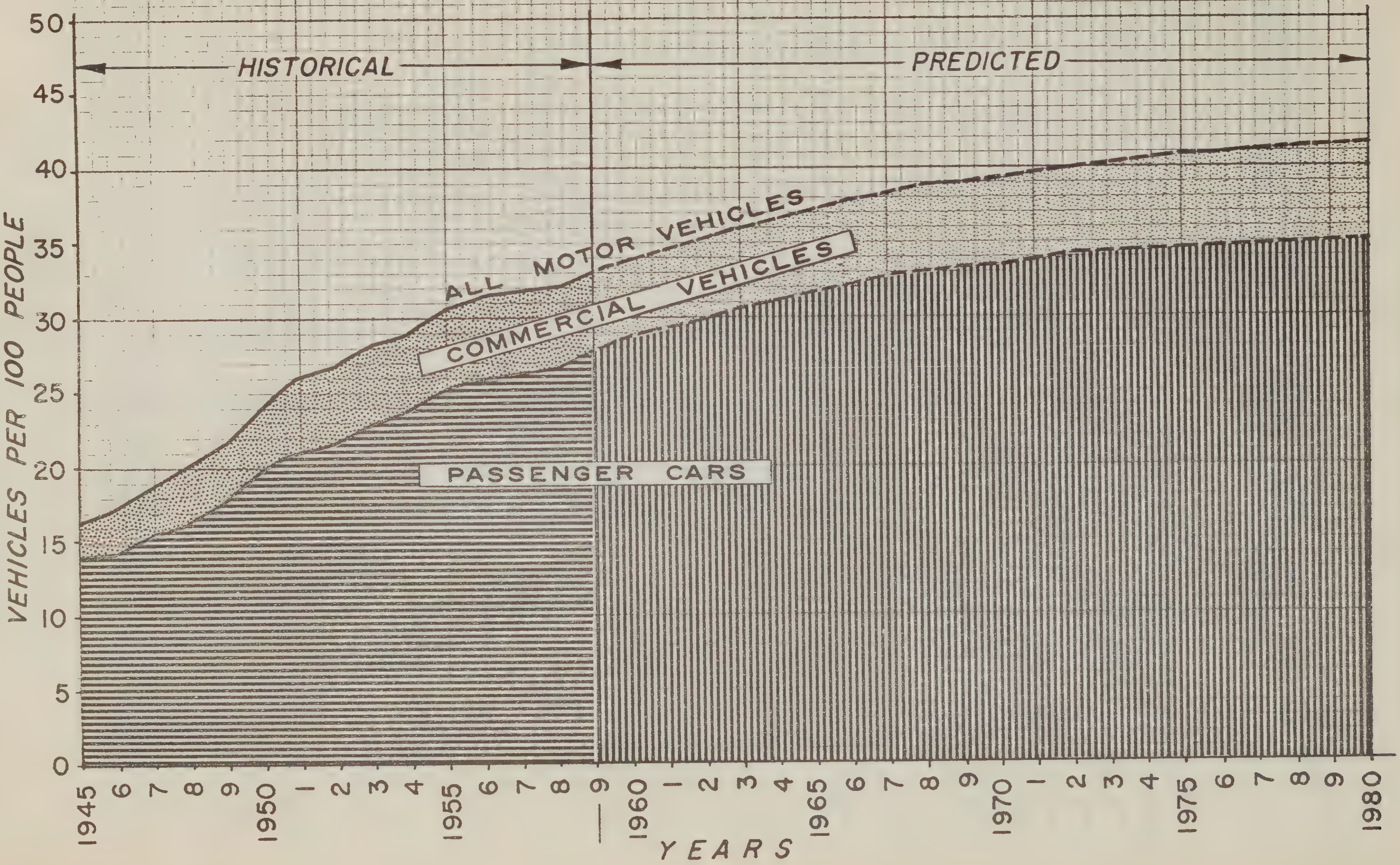


CHART VI

PROVINCE OF ONTARIO
MOTOR VEHICLE OWNERSHIP
1945 — 1980



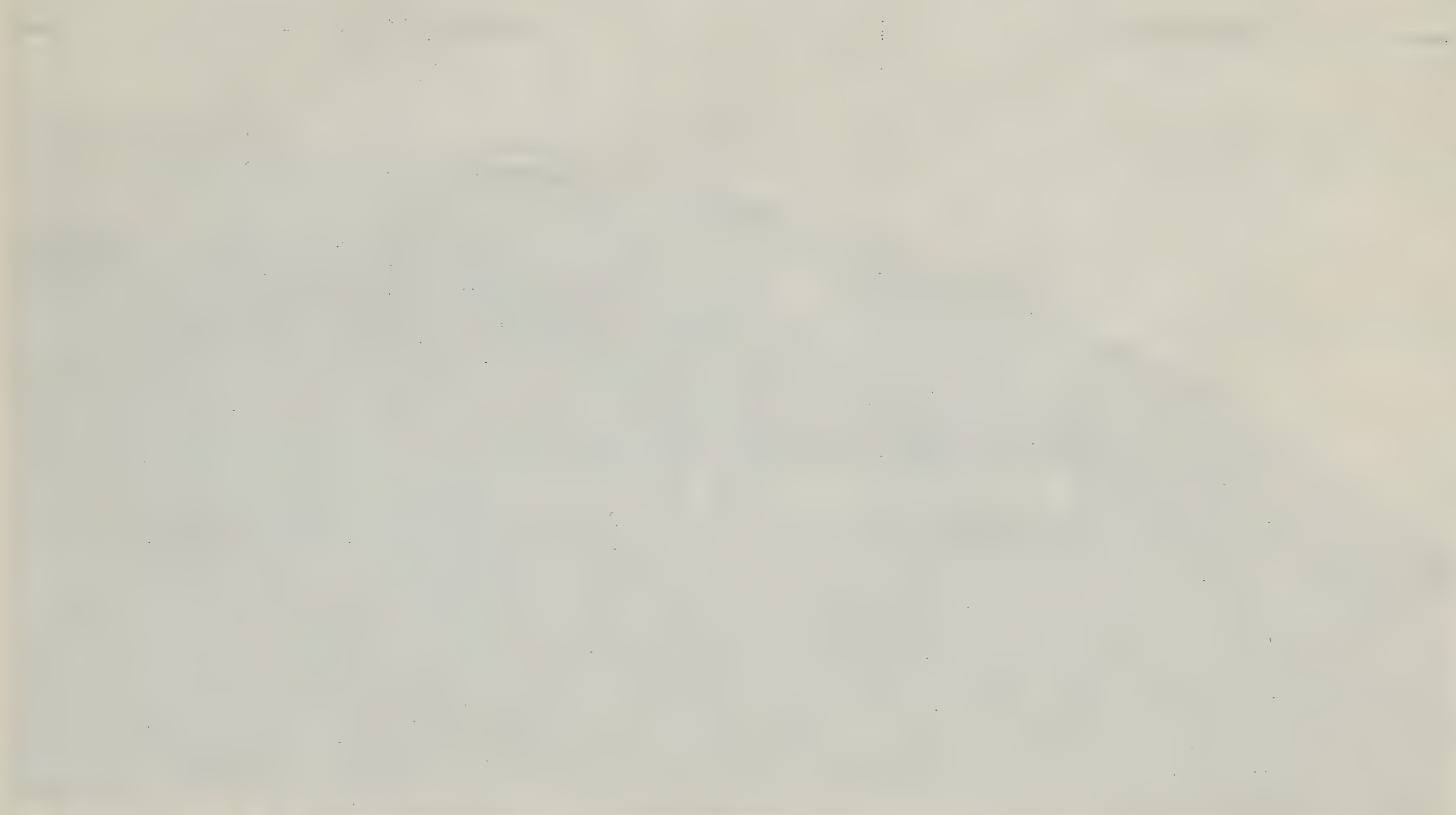


CHART VII

DENSITY OF MOTOR VEHICLE OWNERSHIP

MOTOR VEHICLES PER 100 PERSONS, TOTAL POPULATION

1920 — 1980

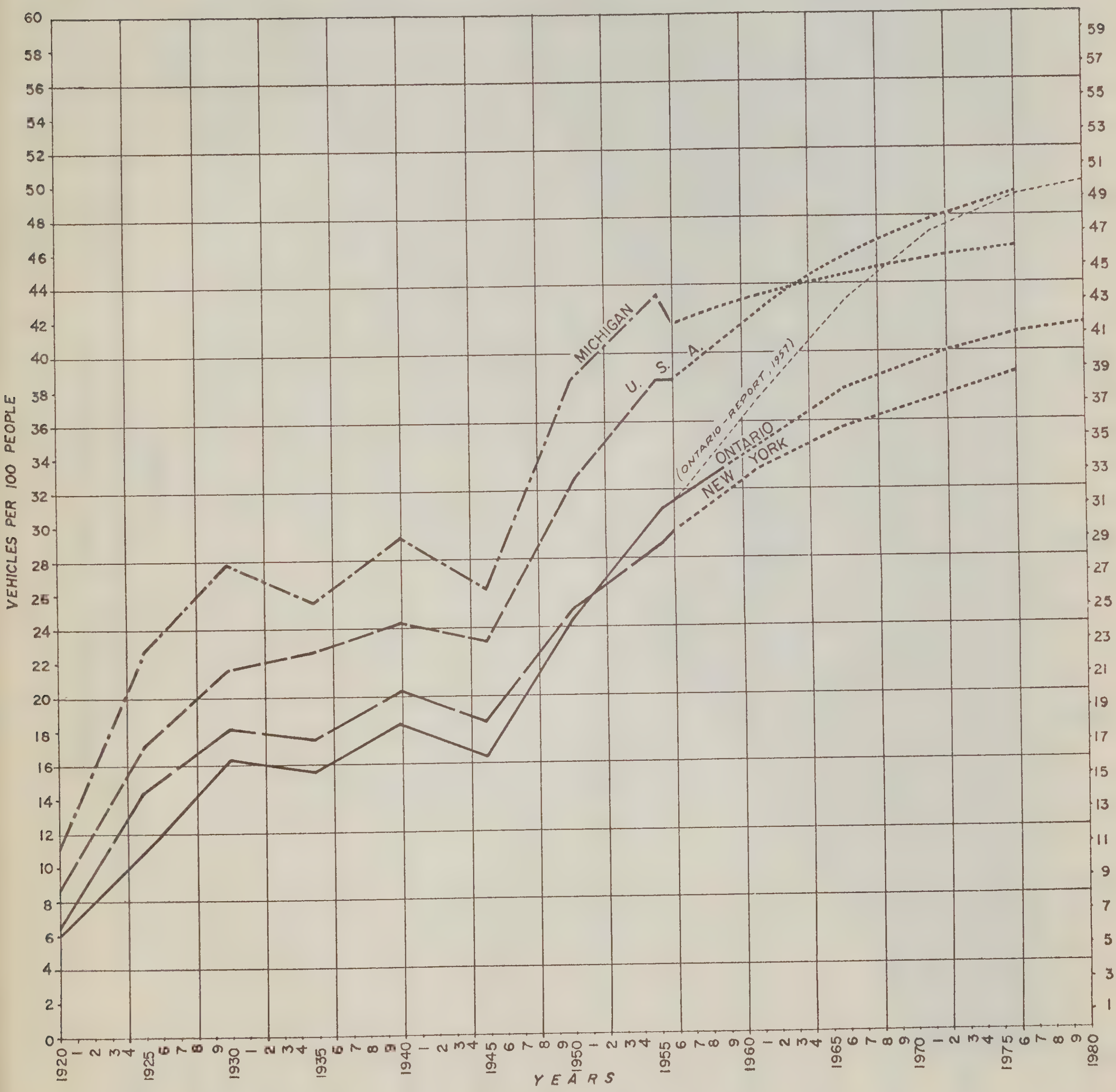
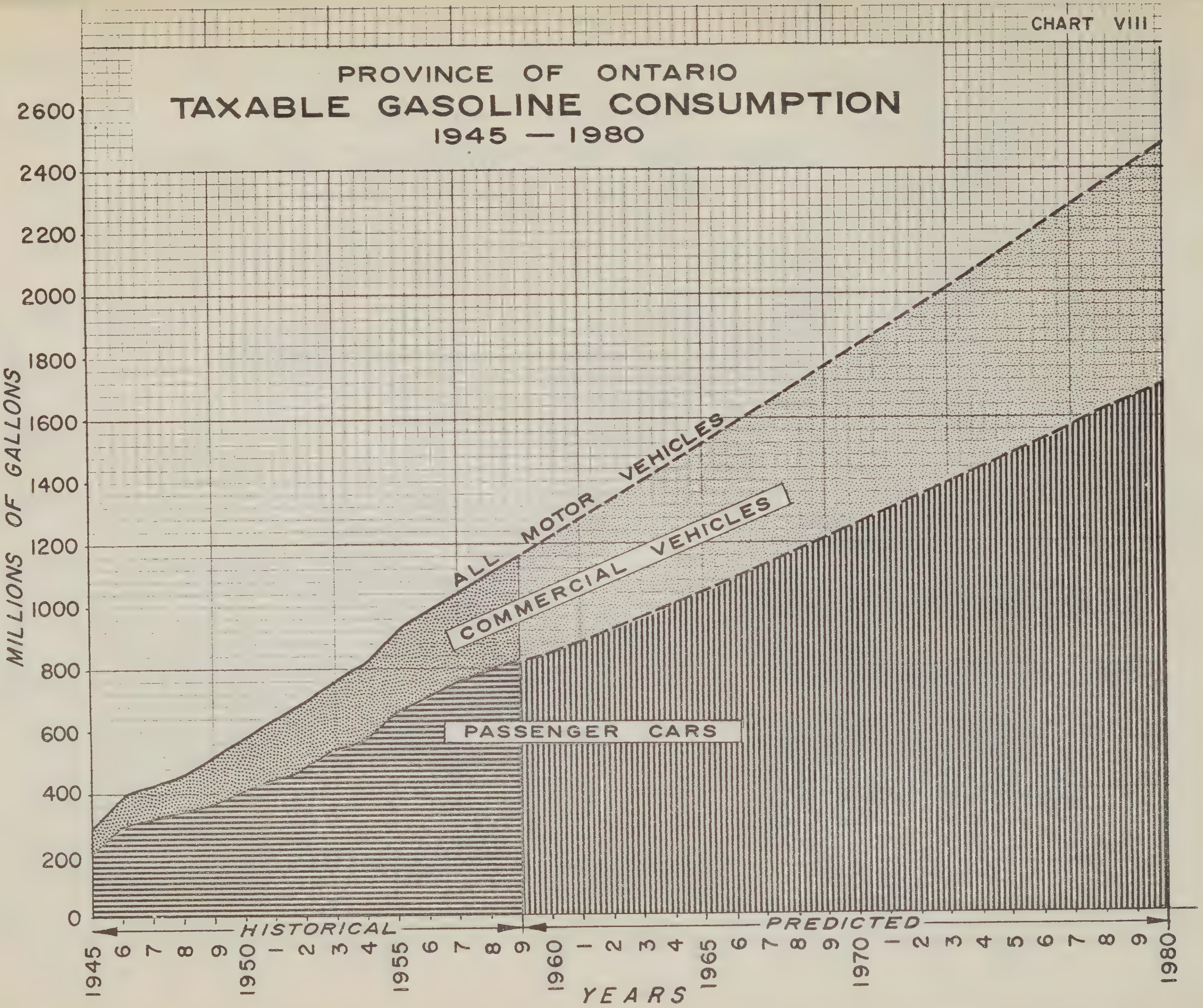


CHART VIII

PROVINCE OF ONTARIO
TAXABLE GASOLINE CONSUMPTION
1945 — 1980



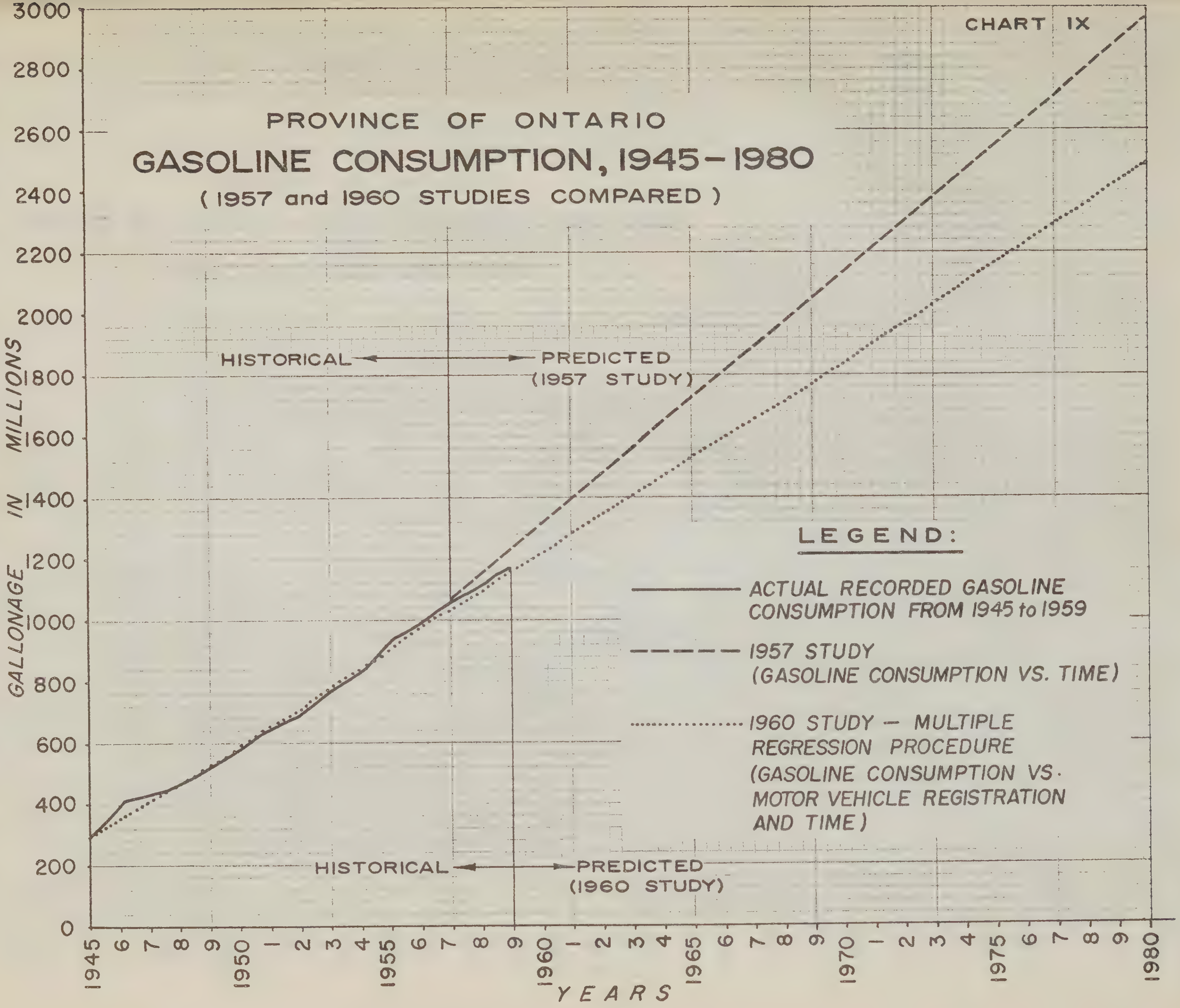


CHART IX

PROVINCE OF ONTARIO
GASOLINE CONSUMPTION, 1945–1980
(1957 and 1960 STUDIES COMPARED)

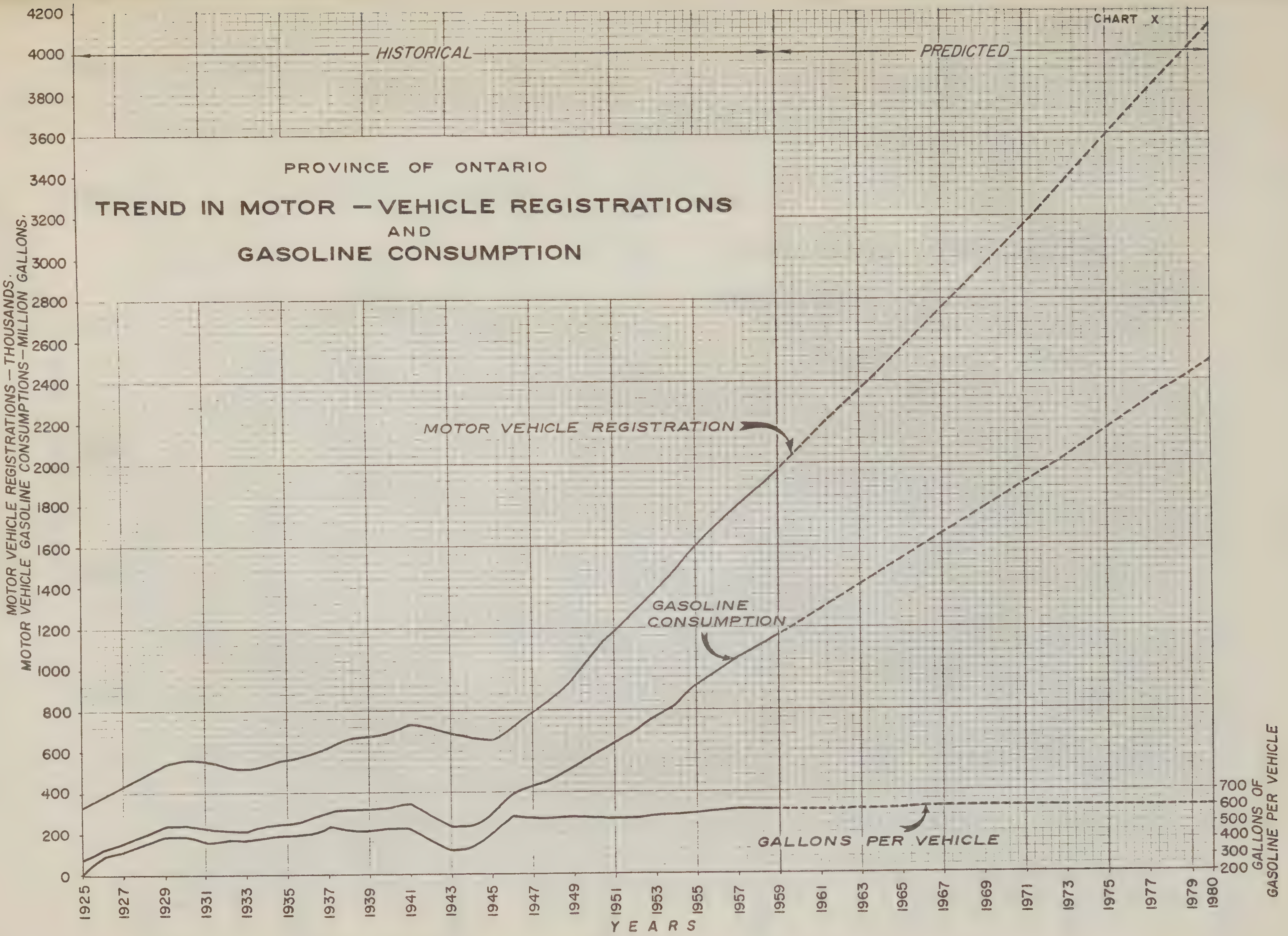


CHART X

PROVINCE OF ONTARIO

TREND IN MOTOR – VEHICLE REGISTRATIONS
AND
GASOLINE CONSUMPTION

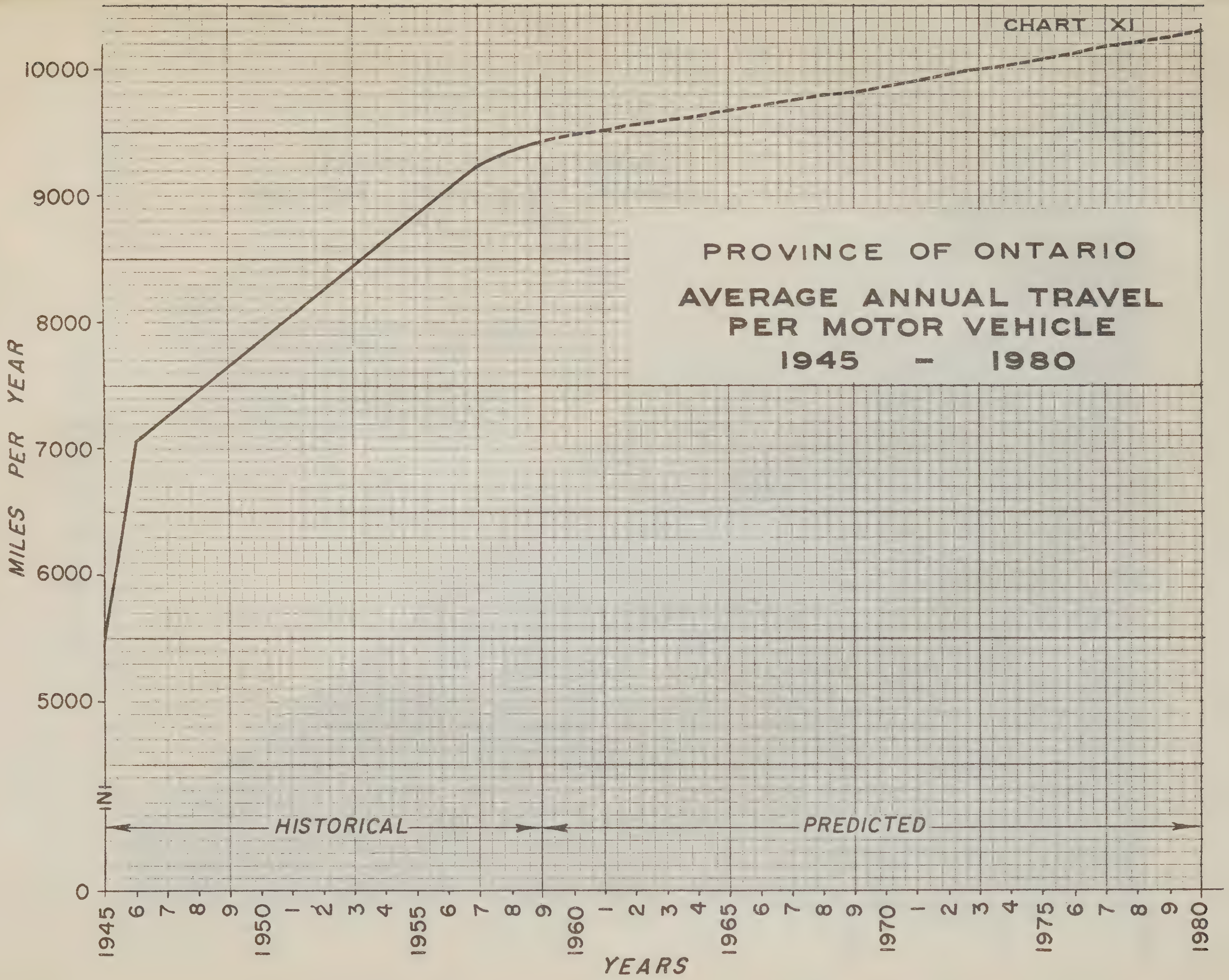


CHART XI

PROVINCE OF ONTARIO

AVERAGE ANNUAL TRAVEL PER MOTOR VEHICLE 1945 - 1980

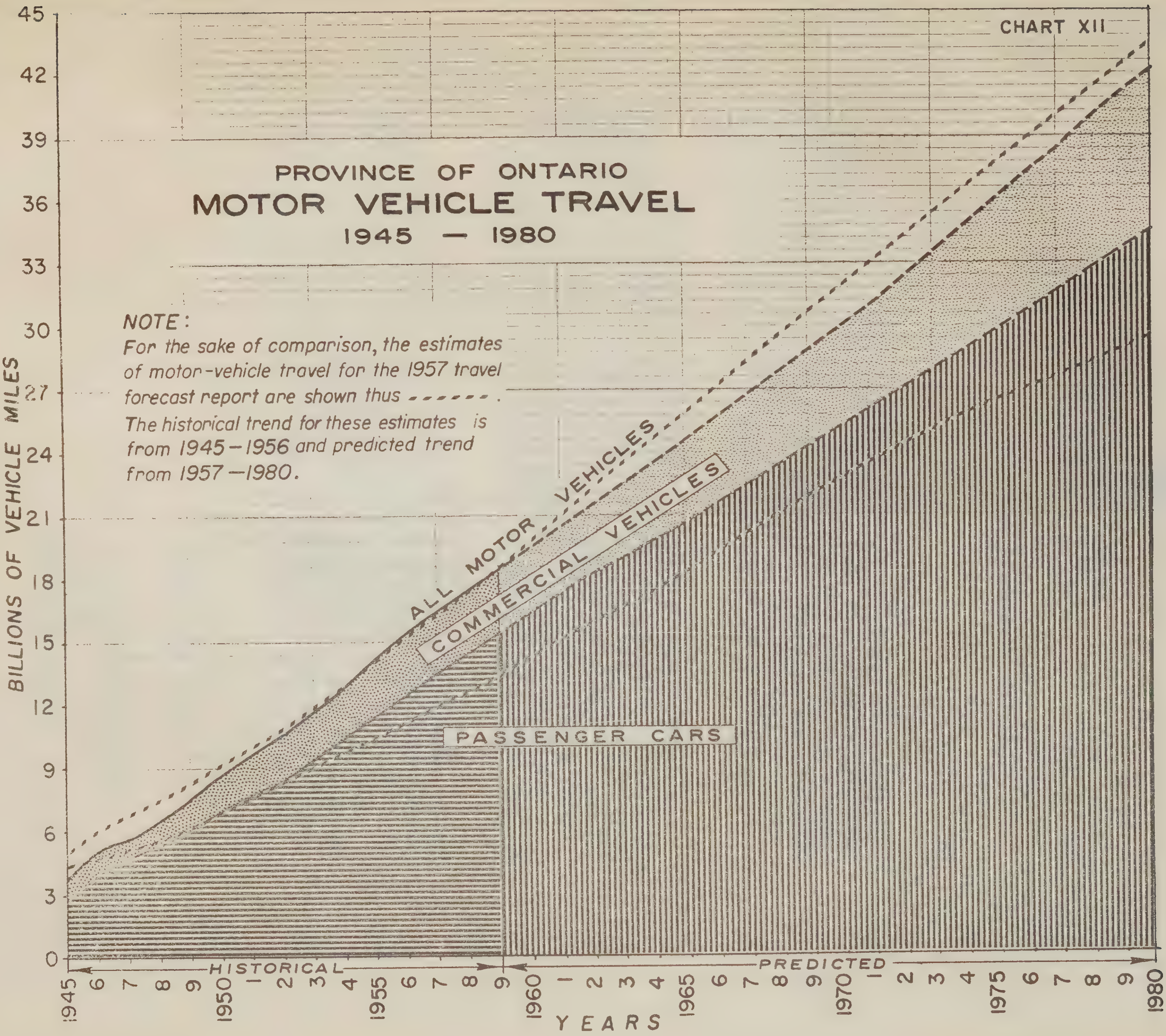


CHART XII

PROVINCE OF ONTARIO
MOTOR VEHICLE TRAVEL
1945 — 1980

NOTE:
For the sake of comparison, the estimates of motor-vehicle travel for the 1957 travel forecast report are shown thus - - - - - - .
The historical trend for these estimates is from 1945–1956 and predicted trend from 1957–1980.

ONTARIO
OFFICE OF
DEPUTY MINISTER OF HIGHWAYS

September 5th, 1961.

I am pleased to present to you a complimentary copy of the travel forecast report entitled " Historic Trend and Forecast of Motor Vehicle Travel in the Province of Ontario". This study was prepared by the Planning Division of the Department of Highways and is the third in a series of periodical surveys of traffic growth in Ontario, and it supersedes all of our previous travel forecasts.

The degree of development of motor-vehicle travel in Canada, and particularly in the Province of Ontario, is extremely sensitive to the economic situation, and cannot be predicted with any great certainty. It is therefore a matter of policy for our Department to make a periodic review of the motor-vehicle travel and its components and adjust them in the light of current developments, i.e. using actual data which have been made available in the intervening years.

The report contains predicted trends in population, motor-vehicle registration, density of motor-vehicle ownership, motor fuel consumption and growth in motor-vehicle travel for 20 years ahead. I hope that the information contained in this study will serve as a guide for persons concerned directly or indirectly in planning, especially as it involves highway transportation, and that it may help to ensure uniformity in planning based on the same estimates.

Yours very truly,

W J Fulton

Deputy Minister.